

Image colorization by semantic-based adversarial models

Patricia VITORIA, GPI, DTIC, Universitat Pompeu Fabra - Barcelone
Lara RAAD CISA, IMAGES, LTCI, Télécom Paris - Palaiseau
Coloma BALLESTER, GPI, DTIC, Universitat Pompeu Fabra - Barcelone

Colorization is the process of adding plausible color information to monochrome photographs or videos. Currently, digital colorization of black and white visual data is crucial in areas such as advertising and film industries, photography technologies and archive image and video restoration.

Image colorization is an ill posed problem since many color images can lead to the same grayscale input. A number of methods have been proposed involving human intervention. This can be in the form of scribbles indicating the color of certain regions or by giving a color reference image similar to the grayscale input to guide the colorization. Currently, methods based on deep learning make automatic colorization possible, taking advantage of the amount of greyscale/color image pairs available to learn which colors are assigned to which objects. Although important progress has been achieved in this field, automatic image colorization still remains a challenge. We propose ChromaGAN [1] based on generative adversarial models. A generative network is used to infer the chromaticity of a given grayscale image conditioned to semantic clues. As a result, the network is able to perceptually colorize a grayscale image from the semantic understanding of the captured scene. Qualitative and quantitative results show that our adversarial technique provides photo-realistic colorful images.

- [1] P. Vitoria, L. Raad, C. Ballester. *Chromagan : adversarial picture colorization with semantic class distribution*. In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision*, pp. 2445–2454, 2020.